

Remarks

In view of the following remarks, favorable reconsideration of the outstanding final office action is respectfully requested. Claims 1 – 55 remain in this application.

**1. Allowed Claims/Subject Matter**

Applicants again note with appreciation that the Examiner has indicated the subject matter of claims 15 – 23, 26 – 30, 39, 40, 44, and 46 – 55 are patentable, and would be allowable if rewritten in independent form.

**2. § 103 Rejections**

A. The Examiner has rejected claims 1, 3 – 5, and 7 under 35 U.S.C. § 103(b) as being obvious over U.S. Patent No. 5,659,453 to Russell et al. (Russell) in view of U.S. Patent No. 4,325,098 to Heller.

Russell is directed to a method and apparatus for detecting an arcing fault on a power feeder line 12. Feeder line 12, which may deliver power over three phase lines, known as phases A, B, and C, which are 120 degrees apart in phase. Russell determines an “X-indicator” for each phase line (A, B, or C). The X-indicator for each phase line ( $X_A$ ,  $X_B$ , and  $X_C$ ) is determined by calculating the numerical correlation to a model function stored within model function portion 104. The model function may be stored as a current ( $I_F$ ) which may be determined empirically, or be simulated, or determined mathematically using known analyses. Russell determines which phase line has faulted by determining which X-indicator has the greatest absolute value. The direction of the fault is determined by the sign of the X-indicator.

Heller is directed to a system for detecting the position of a fault on an electric link. Heller is not directed to detecting arc faults – Heller is directed to detecting short circuits on a transmission line due to the presence of foreign bodies on the line. Heller teaches a system that compares a memorized, or historical voltage, that occurred *before* the short circuit to a current that occurred *after* the short circuit.

According to the MPEP 2143, three basic criteria must be met to establish a *prima facie* case of obviousness. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

### ***Response to Examiner's Arguments***

#### **2. A.1. The Prior art references do not teach or suggest all of the claim limitations**

The Examiner failed to answer applicants' arguments with regard to col. 4, lines 1 – 5 (Russell). Applicants pointed out that the cited text does not teach “*a power line circuit which detects load current fluctuations in a load current and line fluctuations in a line voltage.*” The cited text merely states that transducer 30 monitors the load current and the phase voltages. This is quite different than detecting *fluctuations* in the load current or line voltage. Indeed, the applicants noted in their previous response, that col. 2, lines 38 – 47 teaches making a determination based on an “X-indicator.” As previously noted, the X-indicator for each phase line (X<sub>A</sub>, X<sub>B</sub>, and X<sub>C</sub>) is determined by calculating the numerical correlation to a model function stored within model function portion 104. See Col. 7, lines 31 – 60. Accordingly, Russell does not disclose a discriminator circuit for an arc fault detector as recited in claim 1. The examiner failed to answer this argument.

#### **Examiner's Admission that Russell does not detect arc fault related transient events:**

The examiner admits that Russell does not teach detecting upstream transient events when the current and voltage fluctuations are in phase. The examiner also admits that Russell does not teach detecting downstream transient events when the current and voltage fluctuations are out of phase.

Heller does not detect arc faults. The applicants pointed out in the previous response that Heller was not directed to detecting arc faults and therefore, Heller does not remedy Russell's deficiencies. The applicants pointed out in the previous response that the Examiner does not point out where Heller teaches or discloses detecting transient events related to arc faults.

The examiner responds by arguing that the recitation of an "*arc fault detector*" should be read out of claim 1 because the term *arc fault* is only found in the preamble. The examiner provides a PTO supplied Form Paragraph which cites *Kropa v. Robie* and *In re Hirao*. The Form Paragraph essentially states that a preamble is not to be accorded any patentable weight when the body of claim does not depend on the preamble for completeness. However, the Examiner does not apply this test to the claimed invention. Indeed, he does not apply the test because the test is not applicable to claim 1 for the following reasons. The preamble states that the invention is directed to an arc fault detector. The recited *arc fault detector* provides context for the recited terms *upstream transient events* and *downstream transient events*. These events have been defined in the specification as electrical signals indicative of an arc fault condition. Accordingly, the examiner's attempt to read out the term "arc fault" from claim 1 is improper because the body of the claim depends on the preamble for completeness.

Heller, on the other hand, is directed to a system that identifies faults due to "short circuits from foreign objects," not from arc faults. See col. 1, lines 40 – 45 As noted in the last three responses, an electronic search of the patent document reveals that the term "*arc fault*" is not present in Heller. As such, the Examiner failed to point out where Heller teaches or discloses an upstream/downstream discriminator circuit disposed within an arc fault detector. Accordingly, neither reference is directed to an arc fault detector, as recited in claim 1.

The Examiner failed to answer applicants' arguments with regard to Heller, col. 3, lines 62 – 68. The cited text states that the "working principle of directional relays is based on the local phase comparison of voltage and current magnitudes measured at one point on the line. Applicants pointed out previously that Heller teaches the use of a memorized voltage, i.e., a voltage measured before the occurrence of the fault condition. See col. 4, lines

1 – 25. Applicants also previously pointed out that the Examiner failed to show where Heller teaches a comparison of line voltage to load current. The Examiner never responded to this argument.

Accordingly, the Applicants respectfully point out that neither Russell nor Heller, whether taken alone or in combination, teach or suggest an arc fault discrimination circuit that compares current fluctuations in at least one current characteristic of *a load current* and voltage fluctuations in at least one voltage characteristic of *a line voltage*. In contrast, Heller teaches a relay that compares voltage and current magnitudes at the same point on a line. The system also requires that two such relays must be employed at either end of the line to localize a fault condition rather than one device as recited in claim 1.

2. A.2. There is No Suggestion to Combine the Prior Art References

The Examiner failed to respond to applicants' arguments. Applicants previously pointed out that *if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). In this case, Russell is directed to a system disposed at a power utility substation that monitors power being provided to a feeder line. Heller is directed to detecting a fault location on a link having two parallel lines, with each line including a compensating capacitor in series between its ends. Using Heller in combination with Russell would require that a compensating capacitor be inserted in each utility feeder line being monitored by Russell. The addition of a capacitor is not only beyond the scope of Russell, but would also change the electrical characteristics of the feeder lines. The examiner merely restated his rejection in response to the above stated argument. The applicants are entitled to a response to their arguments.

The Examiner has not made a prima facie case of obviousness for the above stated reasons. While claims 3, 4, 5, and 7 are patentable in their own right, these claims are also patentable by virtue of their dependency from claim 1. Accordingly, claim 1 is patentable under 35 U.S.C. § 103(a). The Applicants respectfully request that the rejection of claim 1 under 35 U.S.C. § 103(a) be withdrawn.

B. The Examiner has rejected claims 11 – 13, 36 – 38, 41 and 42 under 35 U.S.C. § 103(b) as being obvious over Russell in view of U.S. Patent No. 5,796,259 to Dickmander.

***Response to Examiner's Arguments***

**2.B.1. The Prior art references do not teach or suggest all of the claim limitations**

The Applicants respectfully point out that the Examiner has failed to make a prima facie case of obviousness because the Examiner does not point out where the references teach or suggest each and every element set forth in claims 11, 41, and 42.

The Examiner fails to answer applicant's arguments. As noted in applicant's *previous two responses*, an electronic search of the document reveals that the term "arc fault" is not mentioned a single time anywhere in Dickmander. Dickmander is not directed to detecting arc faults.

The applicants also pointed out that the examiner failed to show where Dickmander discloses a sensor for detecting either line voltage fluctuations or load current fluctuations, or a discriminator that compares the polarities of line voltage fluctuations with load current fluctuations. Dickmander does not teach voltage fluctuation, only the existence of an AC voltage having a positive polarity and a negative polarity. Thus, the Examiner has failed to show where Dickmander discloses the claim elements that are clearly not shown in Russell. Accordingly, Dickmander does not make up for Russell's deficiencies.

Examiner's response to Applicants' Arguments. The Examiner states that "Dickmander is being relied upon to show that it is known to compare the polarities of voltage fluctuations and current fluctuations..." The Examiner states that he is relying on col. 3, lines 5 – 15. Even if everything that the Examiner states is true, applicants respectfully point out that the subject matter disclosed by the cited text does not pertain to what is being recited in claims 11, 41, and 42. As noted in the last several responses, the Examiner has failed to show where Dickmander compares line voltage to load current. The cited text states that "*the invention (i.e., Dickmander's invention) determines...the polarity of the current deviation between the present cycle and the prior cycle...*" Col. 3, lines 6 – 11. Accordingly,

Dickmander compares a present cycle to a previous cycle for either voltage or current, not a comparison of contemporaneous line voltage fluctuations and load current fluctuations.

2.B.2. There is No Suggestion to Combine the Prior Art References

The Examiner's reason for combining the references is not in accordance with MPEP 2143 or established precedent. In the Examiner's response to the Response to Arguments section he states that it would have been obvious to combine Russell and Dickmander "for the purpose of more efficient fault detection." *In re Vaeck* specifically provides that "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." Clearly, the Examiner's motivation for combining (i.e., for the purpose of more efficient fault detection) did not originate in the references themselves or from knowledge generally available in the art, but rather from the Examiner himself. Indeed, the Examiner has failed to point to any statement, in either the cited patent references or in any published reference representing knowledge generally available to one of ordinary skill, that supports his motivational statement. The Examiner's motivational statement is an off-the-cuff statement made by the Examiner and is, therefore, improper.

The Examiner fails to answer applicant's arguments. On the other hand, applicants have pointed repeatedly pointed out that "if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The applicants noted in the previous responses that Russell is directed to an analyzer disposed in a power utility substation. The analyzer monitors for arc burst patterns. Dickmander is directed to monitoring a silicon transfer switch that is used to provide uninterrupted power to a building, plant or military base. *Dickmander is not directed to arc faults – Dickmander detects short circuit conditions.* Accordingly, Dickmander could not be used in Russell because it does not detect arc faults. As noted above, an electronic search of the document reveals that the term "arc fault" is not mentioned a single time anywhere in Dickmander. The Examiner did not bother to respond to the applicants' arguments.

The Examiner has not made a prima facie case of obviousness for the aforementioned reasons. Dependent claims 12 – 13, 36 – 38 are allowable in their own right. Accordingly, claims 11 – 13, 36 – 38, 41, and 42 are patentable under 35 U.S.C. § 103(a). The Applicants respectfully request that the rejection of claims 11 – 13, 36 – 38, 41, and 42 under 35 U.S.C. § 103(a) be withdrawn.

C. The Examiner has rejected claims 2 and 6 under 35 U.S.C. § 103(b) as being obvious over Russell in view of Heller, and further in view of U.S. Patent No. 5,439,509 to Blades. Claims 2 and 6 depend from claim 1.

***Examiner Failed to Respond to Applicants' Arguments***

Applicants have repeatedly pointed out that neither Russell nor Heller, whether taken alone or in combination teach or suggest all of the limitations recited in claim 1. Applicants have also pointed out that the Examiner has not shown the Blades includes the elements missing from the base references. Accordingly, claim 2 and claim 6 are allowable by virtue of their dependency from claim 1.

Applicants have also pointed out in several communications that Russell, Heller, and Blades are not combinable. In the previous two responses the Applicants pointed out that Heller could not be combined with Russell because it would make Russell unsatisfactory for its intended purpose. The same rationale applies to Blades. Russell discloses a computerized analyzer disposed in a utility substation. Blades discloses an arc fault detector used by a repairman to diagnose intermittent arc faults in a residential setting. See col. 21, lines 60 – 66, Figures 10 – 12. The Examiner neglected to reply to the points raised by applicants.

Accordingly, claims 2 and 6 are patentable under 35 U.S.C. § 103(a). The Applicants respectfully request that the rejection of claims 2 and 6 under 35 U.S.C. § 103(a) be withdrawn.

D. The Examiner has rejected claims 8 – 10 under 35 U.S.C. § 103(b) as being obvious over Russell in view of Heller, and further in view of U.S. Patent No. 4,922,368 to Johns. Claims 8 – 10 depend from claim 1. As noted above, neither Russell nor Heller,

whether taken alone or in combination teach or suggest all of the limitations recited in claim 1.

***Examiner Failed to Respond to Applicants' Arguments***

Applicants pointed out that the Examiner has not shown the Johns reference includes the elements missing from the base references. Accordingly, claim 8 – 10 are allowable by virtue of their dependency from claim 1.

Applicants also have argued that Russell, Heller, and Johns are not combinable. In the last two responses the Applicants have pointed out that Heller could not be combined with Russell because it would make Russell unsatisfactory for its intended purpose. The same rationale applies to Johns. Russell discloses a computerized analyzer disposed in a utility substation. Johns discloses a discriminator circuit for use in a circuit breaker. See col. 3, lines 3 - 6. The Examiner has failed to respond to this argument as well.

Accordingly, claims 8 – 10 are patentable under 35 U.S.C. § 103(a). The Applicants respectfully request that the rejection of claims 8 – 10 under 35 U.S.C. § 103(a) be withdrawn.

E. The Examiner has rejected claims 24, 25, 33, 43, and 45 under 35 U.S.C. § 103(b) as being obvious over Russell in view of Dickmander and further in view of U.S. Patent No. 5,434,509 to Blades.

***Examiner Failed to Respond to Applicants' Arguments***

Applicants pointed out that neither Russell nor Dickmander, whether taken alone or in combination, disclose every element of independent claims 11 and 42. The Examiner does not provide any evidence that Blades remedies the deficiencies of these references. Accordingly, claims 24, 25, 33, 43, and 45 are at least patentable by virtue of their dependency from claims 11 and 42.



As noted above, Russell and Dickmander are not combinable under 35 U.S.C. § 103(b). Blades is also not combinable because Russell discloses a computerized analyzer disposed in a utility substation, whereas Blades discloses an arc fault detector used by a repairman to diagnose intermittent arc faults in a residential setting. See Figures 10 – 12. Blades would make Russell unsatisfactory for its intended purpose. The Examiner did not respond to this argument either.

Accordingly, claims 24, 25, 33, 43, and 45 are patentable under 35 U.S.C. § 103(a). The Applicants respectfully request that the rejection of claims 24, 25, 33, 43, and 45 under 35 U.S.C. § 103(a) be withdrawn.

F. Examiner has rejected claims 31, 32, 34 and 35 under 35 U.S.C. § 103(b) as being obvious over Russell in view of U.S. Patent No. 5,796,259 to Dickmander, and further in view of Johns.

***Examiner Failed to Respond to Applicants' Arguments***

As noted above, neither Russell nor Dickmander, whether taken alone or in combination teach or suggest all of the limitations recited in claim 11. The Examiner has not shown the Johns includes the elements missing from the base references. Accordingly, claim 31, 32, 34 and 35 are allowable by virtue of their dependency from claim 11.

Applicants also pointed out that Russell, Dickmander, and Johns are not combinable. The Applicants previously pointed out that Dickmander could not be combined with Russell because it would make Russell unsatisfactory for its intended purpose. The same rationale applies to Johns. Russell discloses a computerized analyzer disposed in a utility substation. Johns discloses a discriminator circuit for use in a circuit breaker. See col. 3, lines 3 - 6.

Accordingly, claims 31, 32, 34 and 35 are patentable under 35 U.S.C. § 103(a). The Applicants respectfully request that the rejection of claims 31, 32, 34 and 35 under 35 U.S.C. § 103(a) be withdrawn.

G. Examiner has rejected claim 14 under 35 U.S.C. § 103(b) as being obvious over Russell in view of U.S. Patent No. 5,796,259 to Dickmander and further in view of Nimmersjo.

***Examiner Failed to Respond to Applicants' Arguments***

As noted in the last response, none of the cited references pertain to an arc fault detector as recited in the instant application. Instead, all of the references pertain to power line monitoring implementations. Again, neither Russell nor Dickmander, whether taken alone or in combination teach or suggest all of the limitations recited in claim 11. The Examiner has not shown that the Nimmersjo reference includes the elements missing from the base references. Accordingly, claim 14 is allowable by virtue of its dependency from claim 11.

Accordingly, claim 14 is patentable under 35 U.S.C. § 103(a). The Applicants respectfully request that the rejection of claim 14 under 35 U.S.C. § 103(a) be withdrawn.

**3. Conclusion**

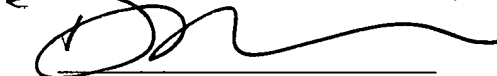
Based upon the remarks and papers of record, Applicants believe the pending claims of the above-captioned application are in allowable form and patentable over the prior art of record. Applicants respectfully request reconsideration of the pending claims 1 – 55 and a prompt Notice of Allowance thereon.

Applicants believe that no extension of time is necessary to make this Response timely. Should Applicants be in error, Applicants respectfully request that the Office grant such time extension pursuant to 37 C.F.R. § 1.136(a) as necessary to make this Response timely, and hereby authorizes the Office to charge any necessary fee or surcharge with respect to said time extension to the deposit account of the undersigned firm of attorneys, Deposit Account 50-1546.

Please direct any questions or comments to Daniel P. Malley at (607) 330-4010.

Respectfully submitted,

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